25X1

TOP SECRET

27 June 1967

MEMORANDUM FOR THE RECORD

SUBJECT: CORONA Film Processing Evaluation

1. The Technical Intelligence and Information Processing Divisions of NPIC are conducting evaluations of film processing methods. The processes under consideration involve the various levels of contrast in developed negatives, referred to as GAMMA, and various levels of contrast in positives made from the negatives. Recently, there have been proposals to process a full KH-4 "bucket" using a new technique called LOW GAMMA rather than the current FULL GAMMA process. To change the GAMMA level would require significant resources because major components of the production processing equipments would require redesign. A test was conducted, using a small quantity of KH-4 material, to determine differences resulting from GAMMA levels. The DCI/NIPE - Systems Analysis Group (SAG) was asked by [redacted] NPIC/IPD and [redacted] NPIC/TID for technical assistance in statistical evaluation of the data collected on the differences in quality of photography resulting from variations in the two processing factors. The purpose of this memorandum is to describe the statistical evaluation conducted and present conclusions and recommendations. In summary, this evaluation has proven that the photo-interpretor's preference for photography developed under the processing variations do not occur randomly. However, from the available data it can not be determined that a particular GAMMA level is better than any other.

25X1 25X1 25X1

2. The study is based on 28 scenes (pictures) taken [redacted] The various scenes were then processed with GAMMA = LOW and INTERMEDIATE or LOW and FULL and POSITIVE CONTRAST = LOW, MEDIUM, and HIGH. Currently, the contractor processing KH-4 film can only do production negative processing with [redacted]

25X1 25X1

GAMMA = FULL or INTERMEDIATE. The use of GAMMA = LOW was proposed by a different contractor and he developed the scenes evolving the LOW GAMMA process under laboratory conditions. 13 scenes were processed with LOW and INTERMEDIATE GAMMA, 15 scenes were processed with LOW and FULL GAMMA and all scenes were processed with three levels of contrast (HIGH, MEDIUM, and LOW) on the positives.

3. In order to determine differences in the quality of photography based on various methods of processing several photo-interpretors and photogrammetrists were asked to rank six images of the same scene developed with the various Contrasts and GAMMAS; each analyst was asked to perform this ranking on four (4) different scenes. Generally, the analysts were given two (2) scenes developed with GAMMA = LOW and INTERMEDIATE and two (2) scenes with GAMMA = LOW and FULL. Each scene was reviewed by four different analysts. Further discussion of exactly how the photographs were developed and assigned to the analysts is attached in Appendix A; LOW GAMMA EVALUATION [redacted] 25X1

25X1

4. In discussions [redacted] the following determinations were made:

a. The test was improperly designed to allow the photogrammetrists to make valid judgments on processing differences and therefore their rankings and rating of the processes were excluded from this analysis (i.e., photogrammetrists do not perform general scan).

b. The photo-interpretors were asked to rate their ability to answer certain specific questions on each scene according to a scale of one (1) to ten (10) with ties allowed. The questions were not the same for all scenes and it can not be determined that the scale had the same meaning for all analysts. Therefore, it was decided that any conclusions based on the rating given by an analyst of his ability to answer a particular question, rather than specific answers to given questions, was not well founded and could not be strongly supported; thus, this method of determining quality differences resulting from the processes

[redacted] 25X1

25X1

was excluded from further consideration. (For general information, Appendix B contains a list of the questions given for each scene).

c. The only useful data from the test was the rankings (one to six and no ties allowed) the analysts gave the images developed under the various processes. However, since the analysts were always comparing "copies" of the same scene developed in LOW and FULL GAMMA or LOW and INTERMEDIATE GAMMA, conclusions from this study can not determine overall differences in LOW, INTERMEDIATE, and HIGH GAMMA--a given scene was not developed using all three GAMMAS.

d. The ranking procedure, no ties allowed, will provide a preference for one process over another; but, there is no means to determine the significance of differences between an analysts assignment of Rank One and Rank Six.

e. To perform an analysis of variance and avoid the assumption of normality; it was agreed that the technique applicable to analysis of the available data is Friedman's Methods of Ranks. This technique requires ranking of data in rows of a two-way table (columns are the different processes) and testing to see if the different columns come from the same universe. The test is made by computing a chi square statistic from the means of the columns. If, in fact, the chi square statistic is small the indication is that difference in the ranking occurred randomly rather than based on differences in the processes and large chi square values indicates that the differences in the processes are real.

5. The following steps were required to conduct an analysis of the ranking data:

a. Prepare frequency distributions of the ranks given to "copies" of the scenes developed with LOW and FULL GAMMA (Table 1) and LOW and INTERMEDIATE GAMMA (Table 2). It was considered that perhaps there

25X1

TABLE 1 - FREQUENCY DISTRIBUTION OF PHOTO INTERPRETORS PREFERENTIAL RANKING OF LOW AND FULL GAMMA FILM PROCESSING METHODS (TOTAL ANALYSTS = 26, TOTAL SCENES = 15)

	PROCESSES						
	LOW			FULL			Gamma
Rank	High	Medium	Low	High	Medium	Low	Contrast
1	15	11	0	3	24	2	
2	28	6	1	5	11	5	
3	8	17	0	11	9	10	
4	1	17	2	10	9	16	
5	3	3	8	17	3	21	
6	0	1	44	9	0	1	
Mean Rank*	2.07	2.87	5.70	4.09	2.21	3.94	

TABLE 2 - FREQUENCY DISTRIBUTION OF PHOTO INTERPRETORS PREFERENTIAL RANKING OF LOW AND INTERMEDIATE GAMMA FILM PROCESSING METHODS (TOTAL ANALYSTS = 26, TOTAL SCENES = 13)

	PROCESSES						
	LOW			INTERMEDIATE			Gamma
Rank	High	Medium	Low	High	Medium	Low	Contrast
1	16	11	0	10	11	1	
2	14	6	0	11	13	5	
3	13	8	1	10	16	1	
4	4	22	1	10	7	5	
5	2	2	4	5	1	33	
6	0	0	43	2	0	4	
Mean Rank*	2.22	3.06	5.80	2.90	2.36	4.35	

* To attach significance to differences in Mean Ranks one would have to assume the data came from a continuous normal distribution. However, one may consider that these data represent the order of the analysts' preference; this is to say nothing concerning, for example, the significance of the close scores between LOW GAMMA HIGH Contrast and FULL GAMMA MEDIUM Contrast.

would be outstanding agreement between the analysts which would lead to obvious conclusions. However, in general, this was not the case. It can be seen in the frequency distributions and mean ranks, shown in Table 1, that the analysts comparing LOW and FULL GAMMA agree that the LOW GAMMA with LOW Contrast is the least desirable process. Except for the agreement on the LOW/LOW process no significant difference in processing is obvious; in fact, LOW GAMMA HIGH Contrast and FULL GAMMA MEDIUM Contrast are very nearly ties.

In Table 2--analysts comparing LOW and INTERMEDIATE GAMMA--it is clear that the LOW Contrasts are considered of lowest preferences regardless of GAMMA. However, considering the dispersion of analysts/scene-ranks in other contrast and GAMMA levels, further statements concerning differences are not justified.

b. In order that Friedman's Method of Ranks may be applied the average ranking assigned to "copies" of the same scene by all analysts were computed by scene. These data are presented in Tables 3 and 5. The processes were then re-ranked from the average values and are shown in Tables 4 and 6.

c. Chi square statistics (χ^2_R) were computed from the data according to the following formula:

$$\chi^2_R = \frac{12}{n\,p\,(p+1)} \sum_{j=1}^{p} \left(\sum_{i=1}^{n} R_{ij} \right)^2 - 3n\,(p+1)$$

25X1

TABLE 3 - MEAN RANK BY SCENE CONSIDERING OPINIONS OF ALL PHOTO INTERPRETORS OBSERVING THE SCENE

Scene	LOW PROCESSES			FULL			Gamma Contrast
	High	Medium	Low	High	Medium	Low	
14	1.33	3.33	6.00	3.67	1.67	5.00	
15	2.50	4.00	6.00	2.25	1.25	5.00	
16	2.0	2.00	5.50	4.25	3.50	3.75	
17	2.0	2.25	6.00	4.25	2.25	4.25	
18	1.75	2.25	5.75	5.00	2.25	4.00	
19	1.25	2.50	5.25	5.00	4.00	3.00	
20	2.75	4.25	6.00	2.75	1.00	3.75	
21	2.00	2.25	6.00	4.50	2.25	4.00	
22	2.50	2.50	6.00	4.50	1.50	4.00	
23	2.0	2.33	5.00	5.67	2.33	3.67	
24	2.0	4.00	5.67	3.67	1.67	4.67	
25	2.5	3.0	5.75	4.0	2.25	3.25	
26	1.5	2.75	6.0	4.0	2.75	4.0	
27	2.67	4.33	4.67	3.33	2.67	4.00	
28	1.67	3.33	5.67	5.00	1.67	3.67	

25X1

TABLE 4 - PREFERENTIAL ORDERING OF PROCESSES BY SCENE BASED ON MEAN RANK IN TABLE 3

	PROCESSES						
	LOW			FULL			Gamma
Scene	High	Medium	Low	High	Medium	Low	Contrast
14	1	3	6	4	2	5	
15	3	4	6	2	1	5	
16	1.5	1.5	6	5	3	4	
17	1	2.5	6	4.5	2.5	4.5	
18	1	2.5	6	5	2.5	4	
19	1	2	6	5	4	3	
20	2.5	5	6	2.5	1	4	
21	1	2.5	6	5	2.5	3	
22	2.5	2.5	6	5	1	4	
23	1	2.5	5	6	2.5	4	
24	2	4	6	3	1	5	
25	2	3	6	5	1	4	
26	1	2.5	6	4.5	2.5	4.5	
27	1.5	5	6	3	1.5	4	
28	1.5	3	6	5	1.5	4	
TOTAL	23.5	45.5	89	64.5	29.5	62	
MEAN RANK	1.566	3.033	5.933	4.300	1.966	4.133	
Deviation	+1.934	+.467	-2.433	-.8	+1.534	-.635	

SUM OF SQUARED DEVIATIONS = 13.273

CHI SQUARE (RANK) = 54.264

25X1

TABLE 5 - MEAN RANK BY SCENE CONSIDERING OPINIONS OF ALL PHOTO INTERPRETORS OBSERVING THE SCENE

Scene	LOW			INTERMEDIATE			Gamma Contrast
	High	Medium	Low	High	Medium	Low	
1	2.25	3.25	6.00	2.75	2.25	5.00	
2	2.00	2.75	6.00	2.75	2.50	5.00	
3	2.25	2.50	5.75	4.00	2.50	4.00	
4.	2.25	2.5	5.75	3.5	1.75	5.00	
5	2.75	4.25	6.00	1.50	2.00	4.50	
6	3.67	4.67	6.00	2.00	2.67	3.00	
7	1.75	3.50	5.75	1.5	3.25	5.25	
8	3.25	2.00	5.25	5.00	3.50	2.00	
9	2.67	3.67	6.00	3.00	2.67	5.00	
10	1.25	2.5	5.00	3.75	2.75	5.25	
11	1.00	3.33	6.00	3.00	2.67	5.00	
12	2.25	2.5	5.75	3.25	2.25	5.00	
13	2.50	3.25	6.00	2.00	2.50	5.00	

25X1

TABLE 6 - PREFERENTIAL ORDERING OF PROCESSES BY SCENE BASED ON MEAN RANK IN TABLE 5

Scene	PROCESSES: LOW High	LOW Medium	LOW Low	INTERMEDIATE High	INTERMEDIATE Medium	INTERMEDIATE Low	Gamma Contrast
1	1.5	4.	6.	3.	1.5	5.	
2	1.0	3.5	6.	3.5	2.	5.	
3	1.0	2.5	6.	4.5	2.5	4.5	
4	2.0	3.	6.	4.	1.	5.	
5	3.	4.	6.	1.0	2.0	5.	
6	4.	5.	6.	1.0	2.0	3.	
7	2.0	4.0	6.	1.0	3.0	5.0	
8	3.0	1.5	6.	5.0	4.0	1.5	
9	1.5	4.	6.	3.	1.5	5.	
10	1.0	2.0	5.	4.0	3.0	6.	
11	1.0	4.0	6.	3.0	2.0	5.0	
12	1.5	3.0	6.	4.0	1.5	5.0	
13	2.5	4.0	6.	1.0	2.5	5.	
TOTAL	25.0	44.5	77.0	38.0	28.5	60.	
MEAN RANK	1.92	3.42	5.92	2.92	2.19	4.62	
Deviation	+1.58	+ .08	- 2.42	+ .58	+1.31	-1.12	

SUM OF SQUARED DEVIATIONS = 11.662

CHI SQUARE (RANK) = 43.273

were

n	=	number of scenes
p	=	number of process
i	=	ith process
j	=	jth scene
Rij	=	rank of jth scene and ith process

χ^2_R for the comparison of GAMMA = LOW and FULL is 54.264. For the six processes (five degrees of freedom) χ^2_R values which would be exceeded by chance once in 20 times is 11.070 and once in one hundred times is 15.086. The probability of a χ^2_R value greater than 40 is .000001. Thus, there can be little doubt that the mean process ranks shown in Table 4 differ significantly, in other words, the differences in mean ranks do not occur randomly.

In Table 6, chi square was computed for the GAMMA = LOW and INTERMEDIATE processing compairson and found to be 43.273. Therefore, it is concluded that differences between these processes did not occur randomly.

d. It was thought that the differences would not be valid or significant if the analysts did not consistently rank the process within the scenes. Therefore, chi square values were computed for each analyst and a sample of these

25X1

values is shown as follows:

Analyst Number	Number of Scenes	Number of Process	Chi Square
17	4	6	11.40
18	4	6	11.40
19	4	6	14.70
20	4	6	18.10
21	4	6	17.50
22	4	6	14.80
23	4	6	15.30

It can be seen that the chi square values are still quite large. One can state that the probability that analysts randomly ranked processes is between approximately .01 and .001 for all analysts.

e. There was also the possibility that within a given scene the analysts would rank the processes randomly. Each scene was examined and a sample of these values is shown as follows:

Scene Number	Number of Analysts	Number of Process	Chi Square
14	3	6	14.3
15	4	6	19.0
16	4	6	10.5
17	4	6	16.0
18	4	6	16.0
19	4	6	13.5
20	4	6	16.0

It can be seen that again the chi square values are fairly large and the probability that the analysts ranked the processes randomly within scenes is approximately between .01 and .001 for all scenes.

25X1

Unfortunately, the Friedman method can not be used to determine the significance of differences between any two or group of the processes other than the entire group that the analysts ranked. The data in Tables 1 and 2 leads one to conclude that the LOW Contrast should be droped from consideration and simply work with the remaining data. This was done simply as an experiment and chi square values on the order of 7.0 and 8.0 were obtained which indicate that the differences between the remaining four process variations are not as significant when LOW Contrast is eliminated from consideration. However, this statement can only be proven if the tests are rerun and the analysts are given samples with only the HIGH and MEDIUM Contrasts.

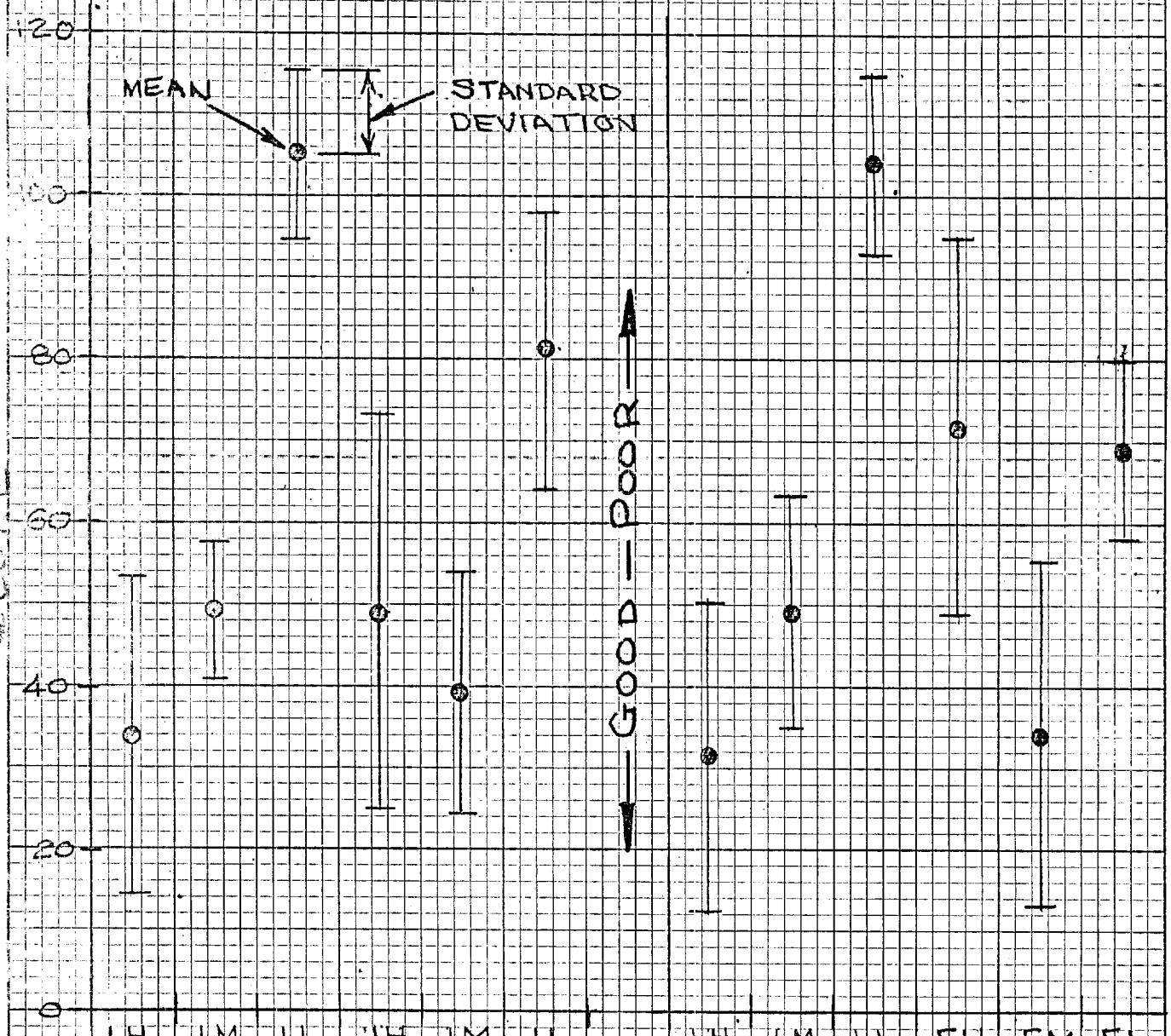
f. One additional statistical experiment was conducted; the assumption that the data came from a universe of continuous normal distribution was made and mean rank-scores and standard deviation were computed. The statistics from this experiment are shown graphically in Figure 1. The lowest score indicates the best process. It is clear that LOW Contrasts for all but FULL GAMMA is the poorest process and the relatively small standard deviation indicate good agreement on this point. However, again there are no clear differences in the remaining HIGH and MEDIUM Contrasts regardless of GAMMA.

6. It is concluded that real quality differences result from the processing variation considered. However, from existing data it can not be determined if these differences result from GAMMA levels (variation in the negative contrasts) or from Contrast (positive contrast) levels. Furthermore, it can not be determined that one GAMMA level is better than another from the existing data. However, it is believed that the evidence from this evaluation justifies the elimination of LOW Contrast positives, made from LOW GAMMA negatives, from further consideration.

25X1

TOP SECRET

FIGURE 1: MEAN PROCESS SCORE AND STANDARD DEVIATION BASED ON ASSUMPTION* OF NORMAL POPULATION



* THERE IS NO BASIS FOR THIS ASSUMPTION

TOP SECRET

7. The following recommendations are made:

a. Based on the fact that the Friedman method indicates quality differences in the processes and the mean ranks shown in Tables 1 and 2, a new experiment should be designed to explicitly determine differences in photographic quality resulting from GAMMA variations and the best positive contrast level for a given GAMMA should be established.

b. NPIC experts should be consulted to determine if differences from [redacted] photography, 25X1 due to higher latitudes, could be expected to impact photographic quality. If operational material is processed for this test it should be limited quantity (400 to 500 feet rather than a "full bucket" processed one way or another) in order that a reasonable comparison may be made. If it is determined 25X1 that [redacted] material is satisfactory for these tests, it is entirely possible that the same photography used in this test may be rearranged and given to the analysts for evaluation in the new test with no requirement at all for additional photography or processing.

c. A limited sample of photo-interpretors (on the order of 12 to 15 but yet to be determined exactly) should be given GAMMA samples of the same scene and "copies" in the MEDIUM and HIGH Contrast for all scenes. A number of scenes, representative of tasking, should be used in the test; the number of scenes should be limited to 8 or 10 (yet to be determined exactly). A scale for measuring quality differences should be designed and the photo-interpretors selected for this experiment should be fully instructed on the meaning of this scale. 25X1

[redacted]

Systems Analysis Group

Attachments: Appendices A and B

25X1 [redacted]

Distribution:

Copies 1 - 2 SAG

25X1 3 NPIC/IPD [redacted]

4 NPIC/TID

5 [redacted]

6 & 7 DD/S&T Registry

25X1

LOW GAMMA EVALUATION

APPENDIX A

SUMMARY

A private contractor has proposed a new development process for aerial negatives, which is called "low gamma" for this study. To determine whether or not it is better than the present development method, Technical Intelligence Division has made a study and requests from IPD:

Assistance in determining how the results will be analyzed.

Necessary data manipulation.

Statistical evaluation of the study.

The data are currently being analyzed by two contractors. TID wants an independent analysis by IPD.

DESCRIPTION OF THE STUDY

1. Chip Sets to be Analyzed.

Certain frames were selected from overt aerial photography and each frame was split horizontally down the middle. Photo chips were selected in pairs from these frames; in each apir one chip was from each side of the split. For each pair, one chip was given the new low gamma development and the other was given full gamma development or intermediate gamma development. For each resulting first generation negative chip (1-N), three positive chips were made: one with high contrast, one with intermediate contrast, and one with low contrast. This is portrayed graphically in Exhibit 1.

The resulting sets of six chips, as shown in Exhibit 1, were either numbers 1 through 6 or 1 through 3 and 7 through 9. In matrix form:

GAMMA	CONTRAST: High	Inter-mediate	Low
Low			
Intermed.			
Full			

OR AND

A frame was made from either a forward or an aft camera.

The sets of six chips were made of some 28 different scenes; 15 from the aft camera and 13 from the forward camera. Each scene was given a number and each chip was given a number assigned at random without regard to scene. The sets were placed in envelopes by scene number. Each set contained either six images of an identical area, or three images of a target area and three images of a contiguous area. See Exhibit 2. The identical coverage was possible because of a ground area overlap on adjacent frames.

2. Ranking.

Four envelopes were given to each of 26 P.I.'s participating in the study. Each PI was asked to rank the six chips of a scene from best to poorest, according to the suitability of the chips for a general scan. No ties were permitted. Each scene was ranked by three of four PI's. Exhibit 3 is a sample of the analyst's rating sheet.

3. Rating.

A supervising PI then prepared from two to four typical questions for each scene. These included such questions as Is there a convoy on the road? How many POL tanks are visible? The questions were printed and lettered A, B, C, and D. In general, question A was easier to answer than B, B than C, and C than D; but this was not intentional. Each of the PI's was given the questions associated with the scenes he had studied. For each scene, the two poorest chips were eliminated. Then the PI rated each remaining chip according to the ease with which each of the questions could be answered. A rating scale of 1, 2, . . . 10 was used (1 = best, 10 = poorest). The question letter was placed beside the rate. Thus, for each chip, questions A through D were placed on the rating scale. Ties were acceptable. Exhibit 4 shows the sheet used for this rating.

The rating was subjective, that is, the questions were not answered and compared with a "school solution," they were only placed on a rating scale showing how easy it would be to answer them using the numbered chip. This is more a ranking than a rating for there was neither instruction nor training in rating. Thus, the following two ratings might be identical, to give just one example:

Scale	Rating	Rating
1		
2	A	
3		
4	B	A
5		
6		B
7	C	
8		
9		C
10		

Exhibit 5 is a copy of the written instructions given to the PI's. This instruction was supplemented by oral explanation.

4. Other Information Supplied.

Each PI also recorded his area of specialty and years of PI experience.

5. Other Participants.

Fifteen photogrammetrists (PG's) also participated in the study but did not list an area of specialty.

CONCLUSIONS

The desired analysis should be reduced to writing by the requester. It is my understanding, however, that the basic objective of the project is to ascertain and evaluate the analysts' preference for gamma and the degree of contrast shown in the 3x3 matrix on page 1. Factors which may compound the result and which should be eliminated, if possible, or at least analyzed, are:

-PI vs PG analysis
-forward vs aft camera positions
-PI specialty (?)
-PI years of experience
-scene differences
-identical vs contiguous targets

The data can be coded and reduced to 960 records, each of which will contain from 19 to 20 digits, all numeric. The records involved are: 40 (analysts) x 4 (scenes) x 6 (chips). Each record will contain the following data:

DATA	NO. OF DIGITS
Analyst number	2
PI or PG	1
Years of experience	1
Specialty	1-2
Scene number	2
Identical target?	1
Fwd or aft camera	1
Chip number	3
Gamma and contrast	1
Rank	1
Rate for Question A	1
" " " B	1
" " " C	1
" " " D	1
	19 - 20

Note 1. Individual analyst's specialties are imprecise (twelve different ones are stated). They should be studied and restated or, perhaps, eliminated.

Note 2. The rates are 1-1Ø. The 1Ø can be punched as Ø and the cards can then be reproduced and each rate can be reduced by 1. This will result in rates Ø through 9 using one column and following standard machine sorting sequence.

Proper analysis, measurement, and determination of statistical significance will require the services of a statistician. The steps would be:

Printouts for examination
Rank order correlation coefficients
Significance testing

RECOMMENDATIONS

Approve the request.

Obtain the services of a statistician, preferably from within the Agency.

Make the proper analyses and tests for significance, using machine assistance if it is superior to hand methods.

Present the data and conclusions to TID.

[redacted] 25X1

Attachments: 6

APPROVED: (orally in IPD staff meeting) 26 May 1967
(date)

Exhibit 6: Suggested form for manual use.

Exhibit 1

CHIP PREPARATION

Gamma Contrast

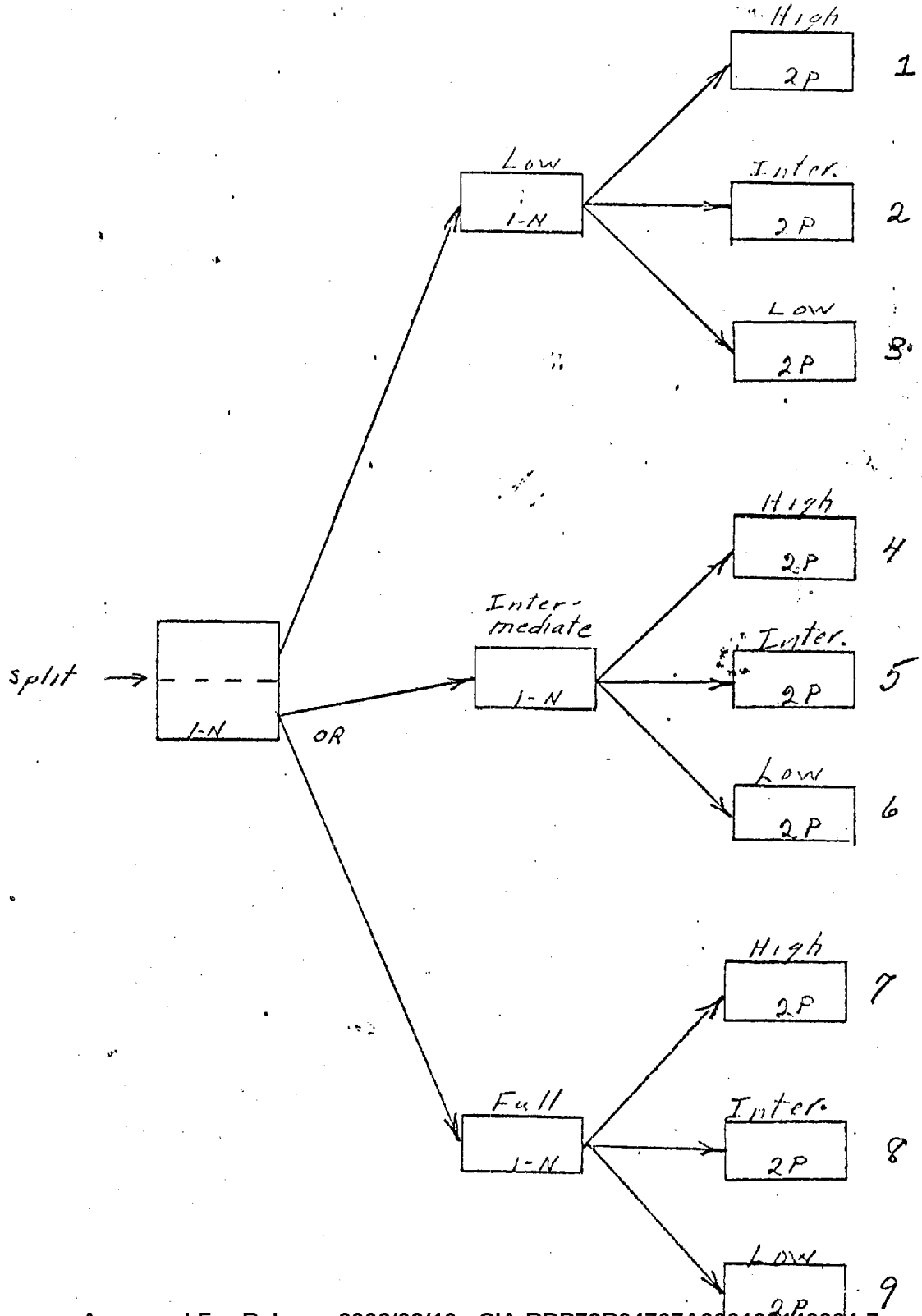
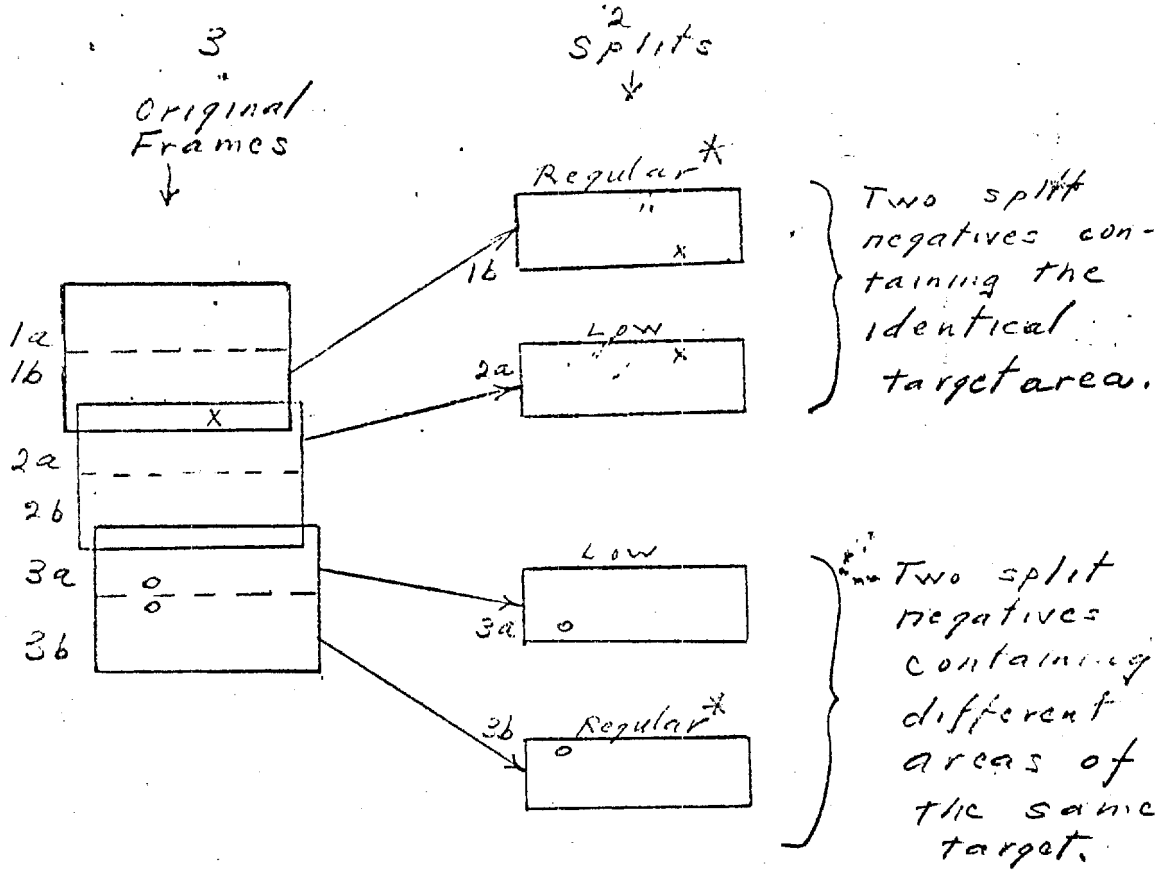


Exhibit C

Two Kinds of Target Coverage



* That is, intermediate or full.

Exhibit 9

25X1

ANALYST TALLY SHEET (RANKING)

Scene # 24	Scene # 14	Scene # 11	Scene # 27
Ranking	Ranking	Ranking	Ranking
Best 1: 91	Best 1: 149	Best 1: 102	Best 1: 211
2: 135	2: 3	2: 112	2: 161
3: 141	3: 71	3: 187	3: 70
4: 45	4: 165	4: 93	4: 18
5: 39	5: 116	5: 124	5: 41
Poorest 6: 97	Poorest 6: 112	Poorest 6: 182	Poorest 6: 167

Exhibit 4

SECRET

ANALYST TALLY SHEET (RATING)

25X1

Best	1		Best	1		Best	1		Best	1	
	2	B		2			2			2	
	3	A C		3	B		3	B		3	B
	4			4	A C		4	A C		4	A
	5			5			5			5	C
	6			6			6			6	
	7			7			7			7	
	8			8			8			8	
	9			9			9			9	
Poorest	10		Poorest	10		Poorest	10		Poorest	10	

SECRET

Exhibit 5

EVALUATION INSTRUCTIONS

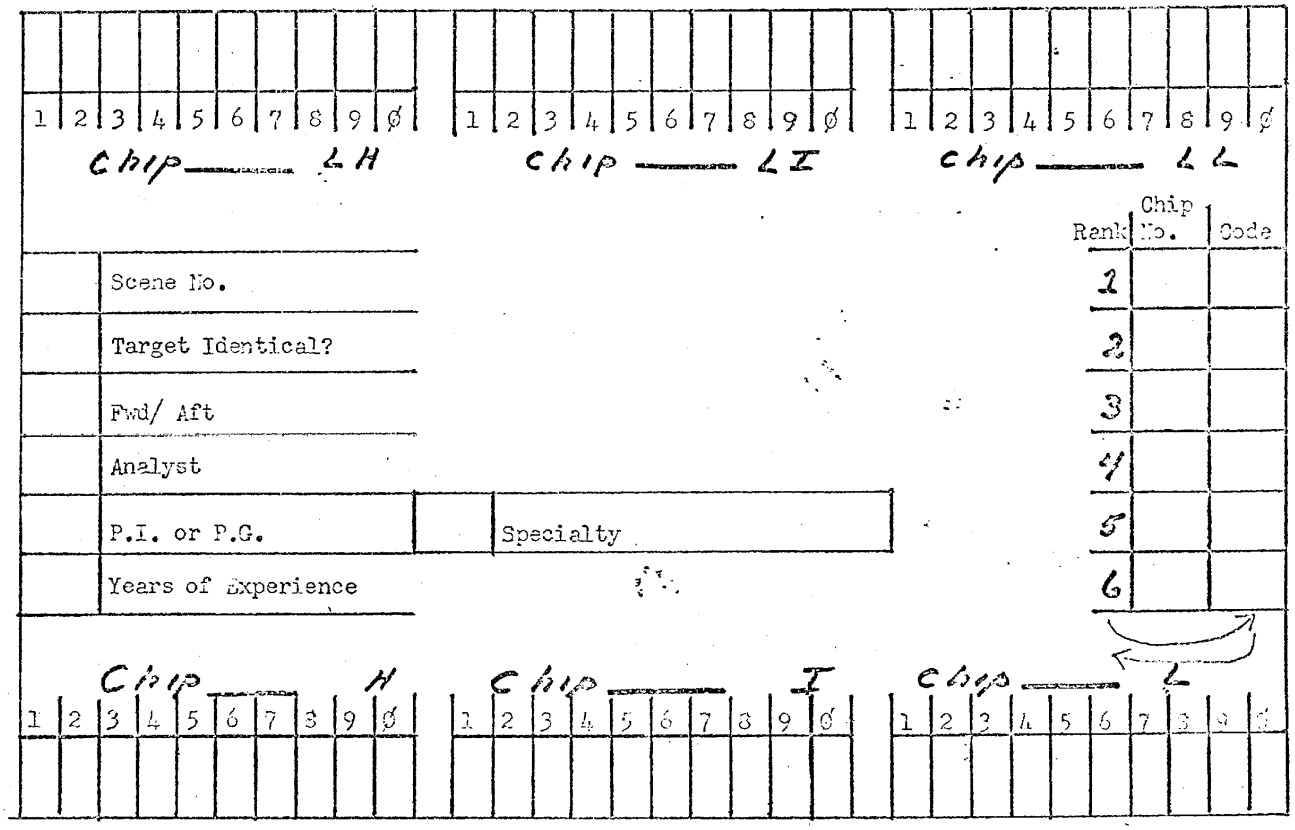
You have been asked to take part in an image evaluation to help determine PI preference for certain types of imagery. The evaluation consists of two phases: ranking and rating.

You will first rank in order of your preference each of the six samples which make up a scene.

You will be asked certain questins about each scene. You are not to answer the question but rather to rate each chip according to its ability to answer the question.

Each individual question of the set is to be answered individually. The appropriate letter shall be entered in the box opposite the number which best describes the chip's ability to answer the question.

SECRET



SECRET

EXHIBIT 2

APPENDIX B

1. a. Determine any damage to road in cloud shadow areas.

   b. Locate possible vehicle rest areas and refueling areas in cloud shadows.

   c. Locate reported armored activity in cloud shadow areas.

2. a. Describe the shape of storage containers and determine their use.

   b. Describe number and type of transport vehicles in area if any.

   c. Any indications of rail transport servicing the area.

3. a. Can missile launch facilities be detected.

   b. Determine if armored activity is present in area - if so, how recently.

25X1

4. a. Count the number of railroad cars.

   b. Determine the type of railroad cars.

   c. Identify the rail to road transfer.

5. a. One of these towns contains a military installation associated with a track and one or more ball diamonds - find the facility.

b. Locate the major warehouses and mode of transportation utilized.

c. Locate, identify, and describe POL storage in the area.

6. a. Are there any indications of new drilling or exploration.

b. Are there any indications of railroad loading facilities or rail lines.

c. Can pipe lines be traced from storage facilities leading away in any direction.

7. a. Concerning the two [illegible] - describe the facilities as to number of piers and [illegible] of covered repaired facilities.

b. Describe the boat launching facilities.

c. Can a fueling pier be located in each chip.

8. a. Describe the security fencing if any, and any other security measures noted.

b. Report number and description of buildings.

c. Can any vehicles be detected within this area. (Type?)

d. Any indications as to the status of this installation.

9. a. Identify the installation.

b. Report number of buildings.

c. Are there open storage or parking areas present.

10. a. Describe runway as to type and construction.

b. Describe the orientation of runway (NS, EW, etc.).

c. Report type and number of aircraft.

d. Any indications of ILS (instrument landing system).

11. a. Identify the water craft.

b. Identify the type of dam.

c. Describe the boat launching facilities if any.

12. a. Identify and assign functions to the buildings.

b. Any indications of warehousing and storage.

c. Identify vehicular activity.

13. a. Determine the degree of permanency of structures in area.

b. Locate any armored activity.

14. a. A suspect military installation has been reported in the area of cloud shadow.

b. An armored unit has been reported in the area. Locate indications there of and determine levels of activity. These areas are in cloud shadow.

c. Identify any vehicular activity on the roads in the cloud shadow.

15. a. Locate troop convoy on road.

b. Locate and report on insurgent activity in area.

16. a. Determine purpose of dam, any indications of hydro-electric facilities.

b. Count and identify the vessels tied to the docks.

c. Determine the order of battle along the shore.

17. a. Count the number of tracks (spurs) in railroad yard.

b. At the left of the railroad yard is a POL storage area; identify and count the containers.

c. Count the buildings associated with the POL area.

18. a. Determine whether this area is a small town or light industrial complex.

b. Identify construction activity west of town.

c. Identify as to type vehicles in the area.

19. a. Can you distinguish the new tracks from the old tracks.

b. Identify the activity.

c. Any indications of storage.

d. Locate and identify railroad transportation.

20. a. Describe port facilities as to type, purpose of piers.

b. Any indications of water depths.

c. Describe any naval vessels observed.

21. a. Identify the area as to purpose and storage facilities.

b. Determine the reason for the amount of trackage.

c. Are there any indications of military training activity in the area.

22. a. Describe the storage area as to purpose, number and type of tanks.

b. Describe the security measures.

c. Describe the power, road, and rail facilities.

23. a. Locate any indications of new construction in urban area.

b. Can vehicles be detected in the area.

c. If yes, can any identification be made as to type.

24. a. Locate and report on any suspect missile activity.

b. Locate construction of new power lines.

c. Are there any indications of security measures being taken near bridges.

25. a. One of these towns reportedly contains a military installation associated with a track and one or more ball diamonds.

b. Locate the warehouses and mode of transportation utilized.

c. Locate, identify, and describe POL storage in the area.

26. a. Determine the status of bridges and overpasses on super highway.

b. Search for and locate new storage site in vicinity of main highway.

c. Locate possible [illegible] activity operating across country. Possible camouflage of vehicles in fields.

27. a. Detect evidence of road realignment.

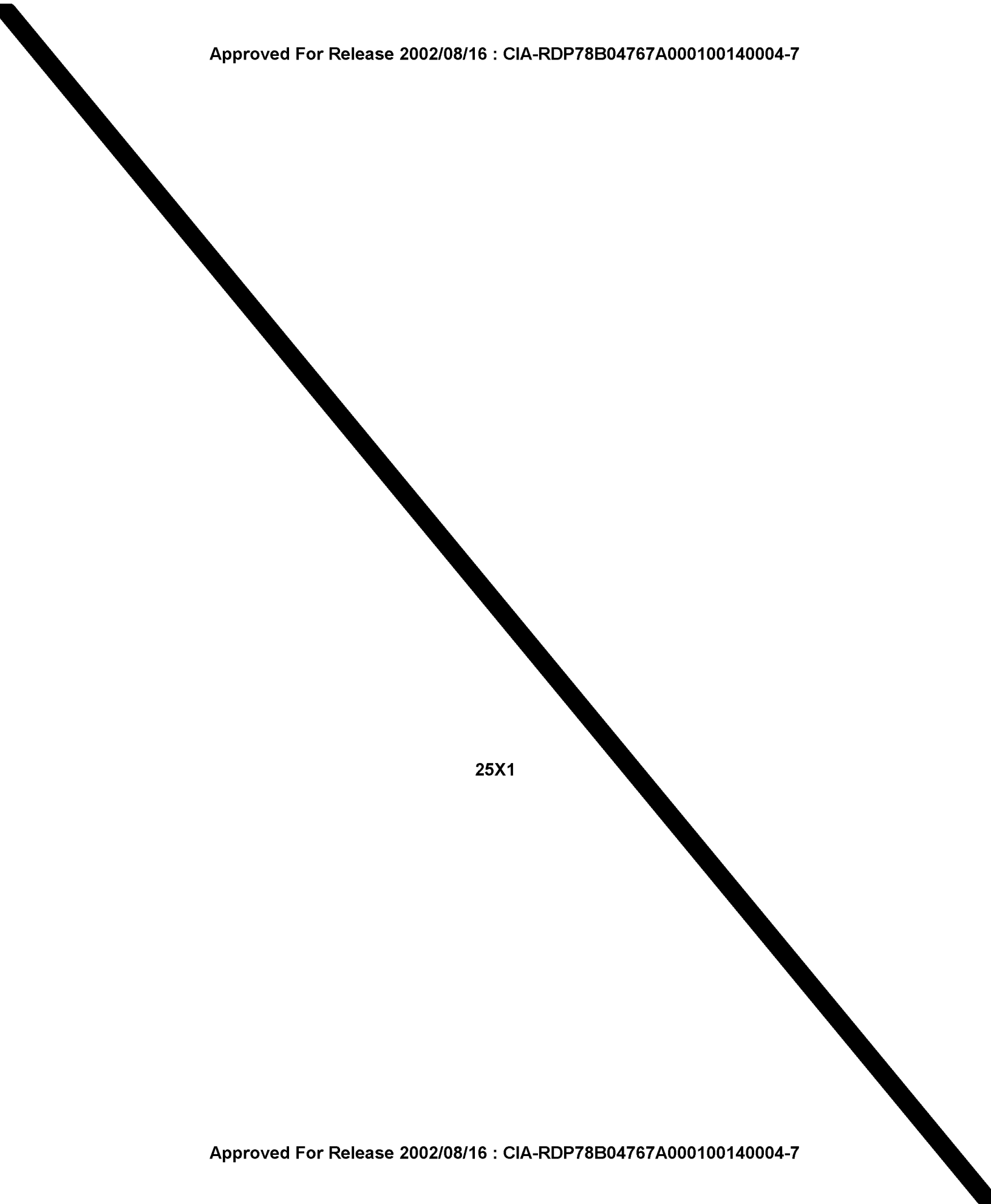
b. Locate rest areas along roads.

c. Report all vehicular activity in area.

28. a. The film has been previously scanned for armored activity with negative results. Rescan and check, particularly the areas in cloud shadow.

b. Locate a probable missile launch facility in the cloud shadow.

SECRET



25X1